

## PATENT ABSTRACTS OF JAPAN

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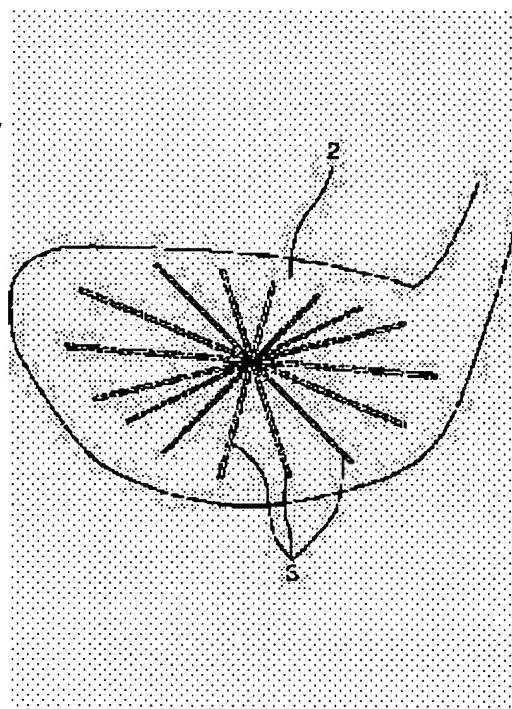
(72)Inventor : NAGASHIMA TSUTAE

### (54) GOLF CLUB

#### (57)Abstract:

PROBLEM TO BE SOLVED: To provide a driver head with a thinner face made from titanium to improve a carry of a golf ball.

SOLUTION: The golf club has a head made from titanium, has Young's modulus of 11.8 E/Pa or under, in a outward direction from the center of the back side of the head face and has several reinforced wires provided to form a semicircular or hollow semicircular crosssection.



### LEGAL STATUS

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**CLAIMS**

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[Claim(s)]

[Claim 1] The golf club characterized by being in the wood made from titanium of a golf club, and \*\*\*\* (ing) the reinforcement wire object of several articles which Young's modulus is 11.8 or less E/Pa, and made the cross-section configuration the hemicycle or the hollow hemicycle toward the center position on the background of the head face side to an outside.

[Claim 2] The golf club according to claim 1 which used the material of a reinforcement wire object as tin or its alloy.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a detail further about a golf driver at the amelioration to the golf driver of a titanium head.

[0002]

[Description of the Prior Art] A titanium alloy is used for a golf club head these days in many cases. This is because specific gravity is as lightweight as about 4.5, so for a thin and bigger driver head to be made and the design of a center of gravity can be made more into a bottom center of gravity when a material is used as titanium.

[0003] However, in order for there to be a fixed limitation also in this thinness from fields, such as reinforcement, and to lengthen the flight distance by bending further, it is necessary to improve the property of the above-mentioned titanium alloy.

[0004]

[Problem(s) to be Solved by the Invention] Then, this invention improves the driver head made from titanium, and aims at enabling a thinner face design and aiming at the rise of flight distance.

[0005]

[Means for Solving the Problem] A \*\*\*\* golf club is constituted considering being in the wood made from titanium and having \*\*\*\*(ed) the reinforcement wire object of several articles which Young's modulus is 11.8 or less E/Pa, and made the cross-section configuration the hemicycle or the hollow hemicycle toward the center position on the background of the head face side to the outside as a description.

[0006]

[Embodiment of the Invention] Although reinforcing materials are made to unite with the wood of a \*\*\*\* golf club, let the material be the metal equipped with Young's modulus smaller than the Young's modulus with which titanium is equipped, or its compound. That is, this invention person thought as important bending in respect of [ which is caused in it there in case the KURABUFU head 1 hits a ball in the factor which increases flight distance / 2 ] a face, and it checked that flight distance was extended, so that the bending was large. Then, for that purpose, \*\*\*\* got first its material made more greatly from the bending which takes place in the case of a blow by considering as the metal equipped with Young's modulus smaller than the Young's modulus in which the titanium alloy as a subject has the above-mentioned reinforcing materials with an eye on making thinner the face side 2 of the head 1 of wood, and enlarging bending. And it is desirable for this material to be more lightweight, because it is because it will be lost by the meaning used as the lightweight titanium head if reinforcing materials are made heavy.

[0007] Then, specifically, this Young's modulus can mention tin or this alloy, aluminum, etc. as a small metal with small specific gravity. In this, although it is a smaller value at 4.99 E/Pa, and tin is 5.8 and it exceeds titanium a little to the titanium of that specific gravity being about 4.5 to the Young's modulus of tin of titanium being about 11.57 E/Pa, the effect which it has on the whole can hold down to little

range. However, the titanium alloy was also taken into consideration and the criteria of Young's modulus were made into 11.8 E/Pa. The alloy of tin, copper and tin, and iron etc. is mentioned to this tin alloy. Tin has the advantage from which a good adhesive property is acquired, when making it unite with the face side of titanium so that it may mention later, since it has the property excellent in the adhesive property with other metals.

[0008] The reinforcing materials consider as the line object of several articles extended from the core on the background of the face side 2 to the radial so that it may mention later, but they make the cross-section configuration a configuration smaller than that of a second moment of area, and as shown in drawing 4, they make it a hemicycle or a hemicycle in the air. It is for enlarging bending of the face side 2 by making a second moment of area small.

[0009] Furthermore, as mentioned above, this reinforcing materials are taken as the gestalt which lengthened the line object of several articles from the core on the background of the face side 2 to the radial toward the outside. Although a core may also tie each line object with the central point (refer to drawing 2), it may set fixed spacing from a core (refer to drawing 3). It is because it is efficient to consider as a radial for the bending which produces this in the face side 2 arises on the whole face focusing on a blow spot and corresponding to it.

[0010] An operation of \*\*\*\* golf wood is explained. First, if a golf ball is hit with \*\*\*\* wood, near the core of a face will serve as a blow spot, and a ball will be flown. Then, bending arises in the face side 2 by the bending moment added focusing on the point used as a blow spot, and flight distance with the bigger repulsive force by this bending is induced.

[0011] If the reinforcement wire object 3 is formed in the background of the face side 2 made from titanium in one at this time, since the Young's modulus of this reinforcement wire object 3 is set up smaller than the Young's modulus which titanium has, it will follow in footsteps of bending [ a titanium face ], and will deform by bigger bending. And since it is combined with the face side 2 in one, this reinforcement wire object 3 reinforces the deformation limitation by bending of a titanium face, and makes further deformation possible. That is, the reinforcement wire object 3 which was rich in elasticity from titanium can compensate bending deformation of a titanium face, and, thereby, enables the design of a still thinner face across the limitation of the face made from conventional titanium so that the hide section to which \*\* was also rich in flexibility to the weak thick section of a bamboo may compensate bending. Moreover, there is effectiveness which softens the metal fatigue which happens to the face side 2 of titanium.

[0012] Subsequently, although this reinforcement wire object 3 is not that of a wrap about the whole surface of the face side 2 and the line object of several articles is \*\*\*\*(ed) to a radial consequently, from the whole rate, the weight increase by having added the reinforcement wire object 3 can be stopped to a very small value, and does not lose the meaning of titanium head original which aimed at lightweightization.

[0013] Moreover, since the cross section of a line object was made into a semicircle or a semicircle in the air with the small value of the second moment of area, its value over bending is large and it increases the effectiveness of the above-mentioned Young's modulus further.

[0014] Furthermore, to the bending which takes place near the core used as a blow spot, as compared with the case where it reinforces only from one directions, such as length or width, the reinforcement wire object 3 extended from the core to the radial can be reinforced towards all the directions, and it becomes efficient [ reinforcement ] more [ it ].

[0015]

[Effect of the Invention] Thus, according to this invention, the outstanding effectiveness that the engine performance for which the thinner face design was attained across the limitation of the conventional head made from titanium, it was lightweight, and the ruggedness updated the property of the titanium head of the description further becomes possible according to an operation of a reinforcement wire object is brought about. Moreover, there is effectiveness which softens the metal fatigue which happens to the face side of titanium, and the effectiveness which lessens the metal fatigue more also in the case of the same thickness is brought about.

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**TECHNICAL FIELD**

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**PRIOR ART**

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**EFFECT OF THE INVENTION**

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**TECHNICAL PROBLEM**

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